

Evaluation of Food Waste Vermicompost on Seedling Greenhouse Cucumber Growth

Shawn Wright Ph.D., Thom Harker, Lynn Miller,
Al Welch, Brad Bergefurd and Rafiq Islam Ph.D.

Introduction

Vermicompost has been often recommended as an amendment to soils and potting mix to promote better plant growth and health and research at The Ohio State University Soil Ecology Lab has confirmed as little as 10% vermicompost can stimulate plant germination, growth and yield.

Dr. Clive Edwards states that "Vermicompost outperforms any commercial fertilizer I know of."... "I think the key factor is microbial activity. Research that I and others have done shows that microbial activity in worm castings is 10 to 20 times higher than in the soil and organic matter that the worm ingests." Dr. Clive Edwards, in "Worldwide Progress in Vermicomposting" by Gene Logsdon in BioCycle October 1994, p. 63.

Recently (BioCycle, March 2004) the Soil Ecology Lab reported that there were statistically different levels of arthropod pests on plants that were had 20-40% vermicompost addition to the potting mix.

Some greenhouse cucumber growers are interested in determining the effects of the addition of vermicompost to a standard potting mix (Pro-Mix BX).

Method

Cucumber seeds (DeRuiter 'Logica' which has full resistance to mildew) were planted in peat pots containing Pro-Mix BX on February 5, 2004 and placed in the germination chamber at a temperature of approximately 84° F. Two days after germination the trays were moved to the greenhouse to begin acclimation at approximately 75/70° F (day/night). On February 14th seedlings were selected for uniformity based upon size of first true leaf and placed individually into 2 gallon black plastic bags.

The experimental design was randomized complete block with 4 blocks, 3 treatments and n=4. The treatments were based upon volumetric substitution of vermicompost (0%, 10%, 20%) DeRuiter variety '9355' was used in the guard rows with no vermicompost. Temperature in the greenhouse was maintained at 85/70° degrees day/night. Supplemental HID grow lights were on during the day from 0600-2100 hours. A double-row system was used with approximately 5 between the centers of each pair of rows. The distance between the two rows within a pair is approximately 1.5 feet. The spacing of plants in the row is 1.5 feet. Laterals were pruned off the main stem as soon as they

appear to allow vigorous early vegetative growth, which is essential for maximum fruit production.

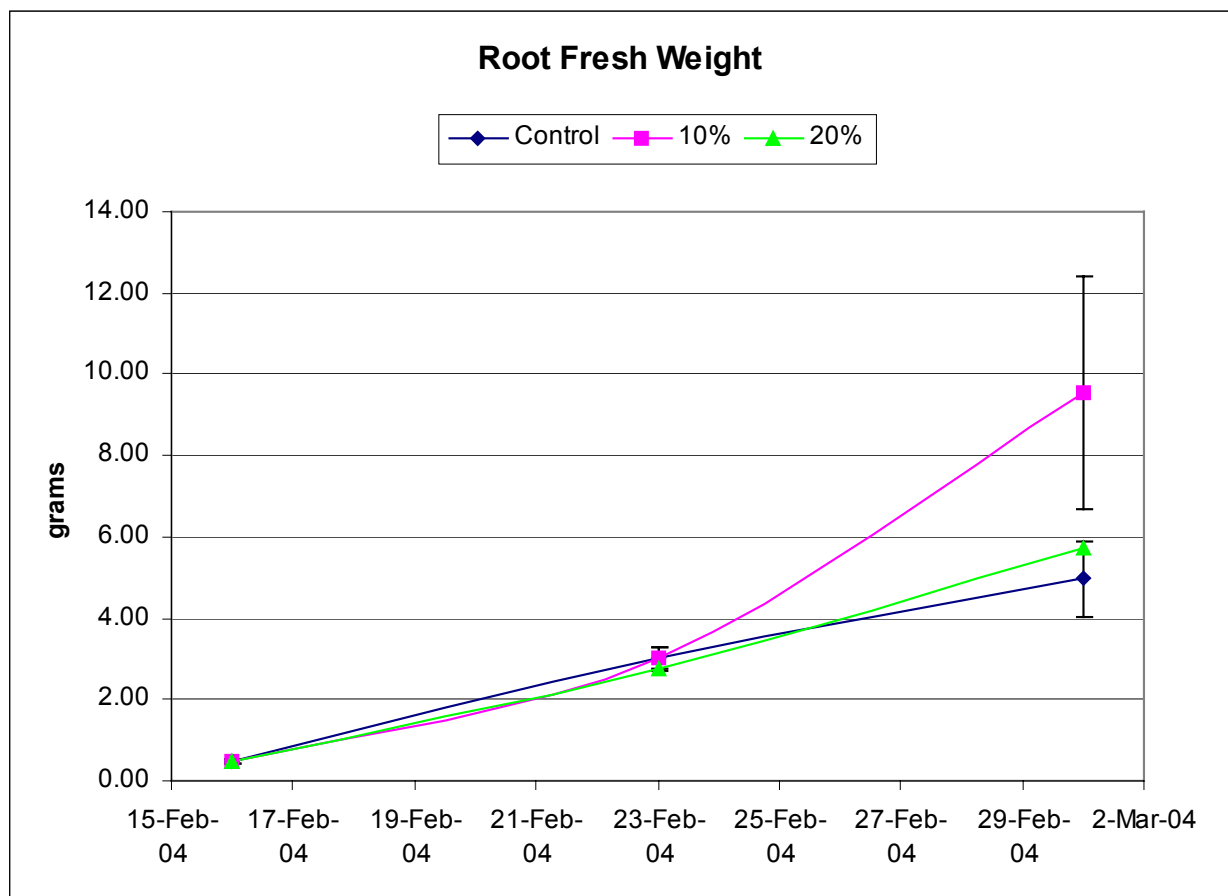
One plant was harvested from each rep on February 23rd and March 1st. Shoots and root fresh weight and dry weights were measured. After March 8th a location effected develop within the greenhouse. Plants were also observed for the development of spider mite problems (*Tetranychus urticae*).

Plants were fertigated thrice daily to “field capacity” using nutrient recommendations from the University of Florida Greenhouse Cucumber Production Guide.

Results

The addition of 10% vermicompost to Pro-Mix BX resulted in approximately 192% greater root fresh weight of seedling cucumbers two weeks after planting. (Figure 1)

Figure 1.



There was no statistically significant difference in shoot growth during this period although the trend was for high shoot fresh and dry weights in the treatments relative to the control.

While the Ohio State University Soil Ecology Lab reports statistically significant differences in arthropod pest populations and plant damage when vermicompost is added to potting mix (Vermicomposts Suppress Plant Pest and Disease Attacks, C.A. Edwards and N.Q.Arancon, BioCycle March 2004) we did not have statistically significant differences although there was a trend for less spider mites with the vermicompost addition. We did observe more damage in the guard rows that had no vermicompost addition, but it may be related to varietal differences rather than the presence or absence of vermicompost. It might be that the difference was due to the fact that their study was done in small cages rather than in the greenhouse.

Conclusions

Vermicompost can significantly increase root growth of seedling cucumbers during the first two weeks of growth. There may be differences in resistance to spider mites when vermicompost is added to the potting mix, however with a high-value crop like greenhouse cucumbers it would not be wise to depend on this method alone.